REMARKS

The Office Action dated July 5, 2002, has been reviewed carefully and the application has been amended in a sincere effort to place the same in condition for allowance.

Election in Response to Restriction Requirement

Applicants would like to affirm the election without traverse to prosecute the invention of Group II, namely claims 10-18 and 28-36. Claims 1-9 and 19-27 have been cancelled herein.

Drawing Correction

Figs. 2 and 3A have been designated by the legend "prior art" as suggested by the Examiner and formal drawings including this change are being filed herewith. Fig. 3B does not include a prior art legend as it is illustrating certain aspects of the present invention.

Objection to the Specification

The Specification has been objected to on the basis that the specification is not clear regarding the limitations of both claims 10 and 28. It is respectfully submitted that the amendments to the claims made herein that closely track the language of the Specification address the Examiner's objection in this regard.

Claim Rejections - 35 U.S.C. § 112

Claims 10 and 28 were rejected under 35 U.S.C. §112 on the basis that the Specification does not support the claim language.

Briefly, the Specification states in the Summary of the Invention that "the present invention provides a direct methanol fuel cell system in which, in response to changes in the output power level of the cell, the concentration of methanol supplied to the anode is actively controlled. . . ." (Specification, Page 2, line 16).

The Specification further states, beginning at page 4, line 27:

> Detector 40 functions to detect the output power level of system 28 and produce a signal (or other suitable indicator) indicative of changes in that power level to concentration regulator 38. In response to changes in the output power level, concentration regulator 38 functions to increase or decrease the concentration of methanol supplied to anode 36 such that methanol cross-over at membrane electrolyte 34 and the associated loss in efficiency are substantially minimized. (Emphasis added).

As discussed in these passages, the output power level of the system is detected and a signal indicative of changes in that output power level is supplied to the concentration regulator. In response to this signal, the concentration regulator then "actively controls" by adjusting ("increases or decreases") the concentration of methanol supplied to the anode. In the description of a specific example in operation, the Specification explains that

> [I]n the low power case, the methanol concentration at point C is significantly elevated [in the example of Fig. 3B], indicating excessive methanol cross-over and attendant loss of efficiency. (Specification, page 4, lines 18-20).

It follows then, that in the low power case illustrated, methanol concentration should be decreased, to avoid methanol crossover.

Accordingly, Applicants have amended claims 10 and 28 to reflect the language of the Specification in the Summary of the Invention and at page 4, line 29, to recite that the concentration regulator "actively controls, by increasing or decreasing, the amount of methanol supplied to the anode...." Dependent claims, which reflect the language of the Specification for the specific examples, are also added herein.

In other words, when a fuel cell is operating at a normal level, there is optimally minimal methanol crossover. When a fuel cell is operating at a low power level, methanol concentration can sometimes be elevated more than necessary, leading to excessive methanol crossover, meaning that the methanol concentration should be decreased. In a high fuel cell output power case, and when methanol concentration is low, this suggests that an optimal amount of methanol is being provided. Or, it may be desirable to supply more methanol to continue the high power operation, and thus methanol concentration is then increased.

The Examiner stated that there may be cases in which the fuel cell is running at high power and it is desired to decrease methanol concentration so that the fuel cell does not produce too much power, and vice versa for a low power operating fuel cell, and such cases probably do arise. However, the present invention is directed at "substantially minimizing" methanol cross-over, and this depends, *inter alia,* on the power level at which the fuel cell is operating, as well as the methanol concentration. Thus, the concentration regulator can function to "increase or decrease the concentration of methanol supplied to anode 36 such that methanol cross-over at membrane electrolyte 34 and the associated loss in efficiency are substantially minimized." (Specification, page 4, line 29 - page 5, line 2).

Information Disclosure Statement

A Supplementary Information Disclosure Statement is also being filed herewith.

SUMMARY

Claims 10 and 28 have been amended to enhance and clarify the claimed invention, and to overcome the rejection. Accordingly, all of the claims have been amended either directly or through dependency and the Examiner's objections have addressed herein. It is, therefore, respectfully submitted that the application is now in condition for allowance.

Please do not hesitate to contact the undersigned to advance the prosecution of this application in any respect.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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MARK-UP PAGES FOR THE OCTOBER 25, 2002, AMENDMENT TO U.S. PATENT APPLICATION SER. NO. 09/718,148

The replacement for claim 10 resulted from the following changes:

10. (Amended) A method of regulating a concentration of methanol in a direct methanol fuel cell system comprising the steps of:

using a detector to sense changes in an output power level of said fuel cell and ~~produce~~producing a signal indicative of said changes; and

using said signal to drive a concentration regulator which responsively [increases] actively controls, by increasing or decreasing, the amount of methanol supplied to said fuel cell's anode in response to changes sensed in said output power level. ~~when said power level increases, and decreases the amount of methanol supplied to said anode when said power level decreases, thereby minimizing cross-over of methanol through said fuel cell's membrane electrolyte.~~

The replacement for claim 28 resulted from the following changes:

28. (Amended) A method of regulating a concentration of ~~methanol~~fuel in a direct ~~methanol~~oxidation fuel cell system comprising the steps of:

sensing changes in potential at an anode or load level of said fuel cell system; and

using said sensed changes in potential to drive a concentration regulator which responsively [increases] actively controls, by increasing or decreasing, the amount of methanol supplied to said fuel cell's anode when said power level increases and decreases [the amount of methanol supplied to said anode when said power level decreases], thereby minimizing cross-over of methanol through said fuel cell's membrane electrolyte.